





42 FIGURE 4B

FIGURE 4C

|46ac|

FIGURE 4D

M34	٥	٥		9	J	0	9	٥	٥	0	0	-	٦	,	7	1	3	1	9	9	9	9	리	-	٥	9	9	•	0	9	0	۰	9	38	929	812	88	27	<u>\$</u>	<u>육</u>	띩	→5
M33	0	0		•	•		٥	0	0	٥		,	, ,	,	3	3	٥	-	0	-	٥	•	•	0	0	0	0	9	٥	9	0	٥	٥	2	<u>~</u>	£	46	8	8	~	51	
M32	0	0	0	9		٥	٥	0	0	٥		•	,	,	9	ء ا	٠,	3	0	9	-	0	0	0	0	0	0	0	0	0	0	٥	9	ę	5	R	23	은	2		3	
ē	0	0	0	-	ᅴ	-	0	0	-	G	6	,	9	•	٠,	-	-	-	0	٥	0	0	0	0	0	0	0	٥	0	0	0	0	0	45	8	흔	쟢	162	188	217	245	
<b>1</b> 24	0	0	0	-	9	0	0	0	0	c	,	9	9	9	9	- ا	9	ğ	8	260	<del>2</del>	220	200	180	160	140	5	ŝ	8	8	9	8	0	٥	٥	٥	0	٥	٥	٥	0	
<b>K</b> 23	0	0	0	0	-	0	٥	0	0	c	}	7	3	9	ه ا	0	0	٥	٥	12	18	24	ຊ	36	42	84	2	8	99	12	78	2	8	٥	0	0	0	٥	0	0	0	
M22	6	0	0	0	0	0	٥	0	6	c	,	7	٦,	9	٥,	9	0	ខ្ល	300	300	300	క్ల	900	ဓ္တ	ğ	క్ల	ဓ္တ	ဓ္တ	ဇ္တ	ğ	ෂි	ဓ္ဌ		0	0	0	0	٥	٥	0	0	1
MZ	6	6	0	0	0	0	6	o	0	,	,	\$	-	5		0	•	2	*	18	22	56	8	ä	ఇ	42	46	જ	8	æ	62	8	20	0	0	0	0	٥	0	0	٥	<u> </u> 
41.8	-		6	0	0	R	33	8	2	1	3 2	3	2	123	64	155	2	0	0	0		0	0	0	6	0		0	٥		6	0	0	0	0	0	0	٥	0		٥	
M13 ×		275	8	225	L	_	┞	╄	╀	4	+	3	┪		┪	$\dashv$		0	0			-	0			6	0	-	0	6	-	0	0	0	-	-	0	0	-	0	0	1
	+-	+	_	405 2	_	ــــــــــــــــــــــــــــــــــــــ	-	L	1	1	4	2	4	7,0	255	240	225	0		6		6		6		-	-	6	6	6		-	-	6	0		0	6	0	6	6	,
1 M12	-	253	+-	₩	<del>-</del>	₩-		+-	+			+	-+		-		100	0	┞	┝	┞	╀	┞		-			-	<u></u>							-	-			-	-	<u>.</u>
E	18	15	360	Ä	32	8	3	15	312			8	٣	<u>₹</u>	Ξ	12	36	_	Ľ	Ľ	Ľ	L	ľ	F	Ŧ	-	F	F	F	F	F	-	F	F	F	F	F	╀	╁	╀	┞	+
Deposition	200	3 8	8	800	1100	1200	900	250	300	3	875	976	877	955	686	799	873	400	2887	1421	631	1736	3422	3433	4022	37.41	2565	1869	Ş	3114	27.52	2583	2969	£63	4957	-	3218	3855	138	4028	3397	
Deposition	À G	3 8	3 8	8	8	8	3 8	3 2	8 8	3	8	8	8	8	60	9	99	45	45	45	45	46	45	45	45	45	45	45	45	45	Š	45	45	\$	45	12	45	\$	45	45	\$\$	
Seg	Pressure:	2 5	2 5	٤	٩	٤	2 5	2 ,	2	2	9	10	01	10	ę	2	2	7.5	7.5	7.5	, 8		1	1	3,4	3,4	1	1 2	1	1 2	֭֚֓֡֜֜֝֓֓֓֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֡֓֡֓֡֓֡֓	1,5		ž .	,	,	4	,	, •	, -		,
Cluster		-[	1	-	-		-[-	-[	-	-	-	1	-	١	-	-	-	_	1	·	1	1	ŀ	1	•	1	1	ŀ	1	1	ŀ	1	1	∱	-	, [		· -	1	,	, ~	<b>,</b>
Step		-[-	-[-		-	-	-[·	-	-[	-	-	-	-	-	-	-	-	-	Ŀ	ŀ	ŀ	ŀ	-	ŀ	ŀ	ŀ	ŀ	<u> </u>	ľ	ŀ	1	1	1	- -	ŀ	<u> </u> -	ŀ	1	╧	1	ľ	1
<b>}</b>	8800		-	-	ŀ	-	-	-	-	-	-	_	-	-	-	-	-	-	-		<u> </u>	- -	- -	. .	1	-	<u> </u>	╁	-	- -	- -	<u> </u>	-	- -	•	ŀ	<u> </u> -	- -	<u> </u>	- -	- -	<u>.</u>
Substrate	Position #	=	2 5	2		6	٩	٦	18	21	22	23	24	25	28	27	28	31	Se	35	3 2	3 6	3	8 5	3	۶ :		15	3	\$	ç e	ş :		8	5 5	3 5	3	8 2	3 2	8 5		<b>₹</b>

4	<b>—</b>	848	첧	260	216	172	128	8	용	0		-	0	0	0	0	0	-		,	}	9	-	52	9	9	9	3	9	0	8	-	9	0	0	0	0	0	0	0	0	
2		45	45	82	- 1		53	\$3	45	0	8	0	0	0	75	0	٥	c	٥	,	•	3	9	9	٥	9	9	ß	9	9	9		9	9	0	0	0	٥	ŀ	0	ŀ	<u>'</u>
		23	23	9	5	43	43	เร	23	-	6	•	Ġ	0	0	0	٥	,	٥	٥	2	Ş,	-	75	٥	0	0	ន	9	٥	9		٥	9	0	0	٥	0		٥	-	ļ
		272	300	328	355	383	411	438	466	0	B	0	0	0	0	0	٥	,	2	9		3	0	ន	9	9	0	ß		9	9	-	0		0	0	0	╄	╀	1	+	1
		0	0	0	0	0	0	0	0	0	٥	٥	0	0	0	6	c	۰	1	3	8	_	0		9		8	0	4	٥	٥	0	8	280	260	-	t-	200	+-	┿	+-	,
		6	0	0	0	0	0	0	0	0	0	0	٥	0	0	c	6	3	1	2	2	9	0	9	9	٥	0	0	0	٥	Щ	Ш	_	8	_	₩	╀	+-	+	३	+-	,
		6	0	0	0	0	0	٥	٥	0	0	0	0	35	0	c	, ;		\$ ,	۰	40	٥	۰	٥	68	٥	76	0	٥	0	0	65	8	300	300	300	300	95	3 8	3 8	4	2
		-	0	0	0	0	0	0	0	0	0	ŀ		٥	6	c	, 5	3 8	3	S	8	٥	0	0	0	0	8	0	0	0	0	0	9	2	18	22	28	Ş	3 2	3 8	٩	2
		-		-	0	0			0	0	0	432	0	0	Ī	, ,	3	3	3	•		0	0	0	0	0	0	0	399	0	٥	0	٥	٥	0	0	٥	واد	,	1	,	2
		-	-	-	0	-	0	0	0	ŀ	0	õ	0	٥	٥	, , ,	3	3		0	0	0	0	0	0	134	0	0	8	٥	0	0	0	0	c	c	c	,		9	٥	2
		6	c		c	, c	,	-	0	6	0	6	c	-	,	,	9	9	•	0	0	0	0	٥	٥	88	0	0	8	0	ŀ	0	0	0	c	6	٥	1	1	1	9	
		-	,	, .	c	, -	, -	۰	-	18	0	0	Ş	٥	,	> 6	3	٥	9	٥	0	0	8	٥	0	0	0	0	2	88	0	-	٥	0	٩	٥	,	1	1	-	٥	<u></u>
		7437		4551	3607	100	4764	1246	2135	212	1543	1910	1200	200	200	200	200	2400	15	8	88	100	400	300	300	200	န္တ	100	8	1200	006	432	400	2328	4220	253	3	0171	5807	1237	4842	٥
		+		3 4			3	3 4	24	2 5	3 8	3 8		?	Ç;	45	45	45	45	45	45	45	45	45	45	45	45	45	45	۶	45	09	45	45		2	2	45	45	45	45	0
		1	1	, ,	1		1		, "	, 5	1	2 5	2 5		2	2	2	7.5	7.6	7.5	7.5	5	2	2	5			Ş	7.5	V	ءِ ر	,	7.5	3,	,	9	5.7	7.5	7.5	7.5	7.5	0
		ļ	7	7	7	1	7	7	7	7	-	,		-	7	,	-	2	2	2	2		-		,	-		, ~	, -	-		,	ŀ	7	, ,	,	1	7	7	7	~	0
		Ţ	†	- -	╡.	-	-	- -	- -	- -	-	1	٦.	-	-	-	-	2	-	~	6	4		, «	'n	- «	, 0	,	-	1	-	ŀ	•	- -	ŀ	-		-	-	-		0
			-	- -	-	-	-	-	1	-	7,	1	7	1	-	-	7	2	•	٥	6					, ,	۰	•	1	1	-	- -	- -	- -	- -	-	-	-	-	-	-	0
<b>5A</b>	<b>←</b>		19	283	3	3 3	82	8	) i	8				2	72	72	73	73	7.4		47	**					*		2 4	e P	2			5 6	8	3	25	82	88	87	88	0

## Figure 5B

										_					_	_	_			_	_
M34	0	0	0	0	-	ŀ	9	9	0	75	3	٥	22	0	0	c		ß	0	C	·
M33	٥	0	75	٥	٥	4	3	9	0	Ş	3	0	180	0	0	٥	9	ß	0		,
M32	0	0	0	-	٥	,	3	9	0	'n,		0	75	0	0	6	9	င္သ	0	c	,
M31	0	0	٥	٥	۶	۹	9	0	0	ξ	3	0	ည	0	c	·	>	20	0	9	7
M24	0	0	6		9	١	9	8	8	6	9	0	0	0	c	, [	ŝ	0	0	ç	2
M23	0	0	c	٥	3 5	١	0	0	79	٥	3	0	0	0	c	1	9	0	0	٥	>
M22	0	150	c		5	-	244	0	46	,	3	0	0	88	c	,	9	0	0	٥	2
M21	0	0	c	,	2 8	3	83	20	66	4	3	0	0	6	c	,	3	0	0	٢	, O
M14	6	0	,	> 2	श्र	5	0	0	0	,	5	0	0	0	c	,	0	0	<u>6</u> 6	4	>
M13	6	c	,	1	3	•	0	0	c	,	5	0	0	0	10.	5	0	0	8	ļ	>
M12	0	c	,	,	5	0	0	0	6	,	0	0	0	6	8	3	0	0	S	,	0
ž	S S	c	,	3	3	•	0	0	c	,	0	100	0	c		,	0	0	120	ŀ	-
Deposition Time	1200	S	3 8	3	8	2400	15	09	ä	3	100	400	300	Sec	8 8	3	စ္တ	8	9		_
Deposition Delay	45	2	3	\$	55	45	45	45	A.	?	\$	45	45	4	,	45	45	45	45	2	0
Gas Pressure	٤	2 5	2	9	10	7.5	7.5	7.5	2 1	Ç	S	ď	2	) u		S	S	10	75	?	_
Cluster #	+	- 6	7	3	1	2	2	1	3 0	2	3	-	- 0	2	7	_	2	۳	,		<u>_</u>
Step #	•	-	-	-	1	2	-		,	7)	4	4	, ,	9		8	6	-	,	v	_
# of Cycles		-	-	-	~	2	·	,	,	6	6	0	n	ກີ	ñ	<b>5</b>	6	,	,	7	•
Substrate Position #	į	=	=	11	35	35	0.7	6	ò	84	87	3 6	6 5	à	à	87	87		;	4	•

## Figure 5C

										_				_	_			_	_
M34	٥	0	0	0	0	0	0	0	75		2	23	င္သ	0	0	Ş	١	9	의
M33	0	0	0	0	0	0	0	0	ç	3	25	188	75	0	0	ç	3	0	9
M32	0	0	0	0	0	0	0	0	ž	3	ß	75	100	0	0	S	3	٥	9
	٥	0	0	0	0	0	0	0	٤	3	75	S	25	0	0	5	3	0	0
M24	0	0	0	0	0	0	8	8	c	,	0	0	0	0	83	4	3	0	0
M23 M24 M31	0	0	0	0	67	0	0	79	٥	2	0	0	0	0	0	ŀ	2	0	0
M22	0	0	0	0	211	244	0	46	6	>	0	0	0	0	76	•	9	0	0
M21	0	0	0	0	8	68	ဇ္တ	8	6	3	0	0	0	0	8	١	9	0	0
41M	0	3	450	25	0	0	0	c		2	0	0	0	0	c	·	-	399	0
ž S	0	0	8	240	0	0	•	6	1	>	0	0	o	134	c	۹	٥	8	0
M12	82	8	120	0	0	0	6	c	,	2	0	0	6	g	1	ŀ	0	ğ	0
ž	g	235	333	S	0	0	G	٥	ì	0	0	0	c	c	,	•	0	120	0
Deposition Time	1200	006	200	909	2400	15	8	3 8	3	18	804	300	300	200	88	3	5	9	0
Deposition Delay	45	45	45	45	ÅŠ	ĀĒ	ÅÅ	1	3	\$	45	45	45	346	3 3	3	\$	45	o
Gas Pressure	Ę	2 2	Ç	2 2	7.5	7.5	3,6	2	Ç	တ	2	ď	) "		2	c	S	5	c
Cluster #	-	-	-	-	- 6	4 6	4 6	7	7	ლ	٠	, ,	,	,	-	7	3	-	
Step #	].	•	-	-	-	-	-	-	-	-	-		-[-	-[.	-	-	-	-	-
# of Cycles		-[-	-[-	-[.	-[-	-[.	-[.		-	,-	-		- .	-		-	_	-	.   c
Substrate Position #	:		7 .	2	*	5 8	7/8	23	24	34	5 5	35	3	\$	4	42	43	2	

## Figure 6A

ပိ	Composition	tion	Exper	Experimental Single	ingle	Total	Total	Calibi	Calibration Factor		Calibra	Calibrated Deposition	osition
				<b>Gun Rate</b>		Power	Rate					Power	
ato)	(atomic ratio)	tio)		(A/s*W)		(W)	(A/s).					S	
ď	3	>	Pt	W	٨	Ptww	Ptwv	ъ	W	Λ	Pt	Μ	>
09	20	20	1.16E-02	-	5.26E-03	.10E-02 5.26E-03 2.00E+02	1.87	0.794	1.058	1.077	11	37	20
40	20	40	1.16E-02  1	1.10E-02	5.26E-03	1.10E-02   5.26E-03   2.00E+02	1.58	0.794	1.058	1,077	44	31	120
40	40	20	1.16E-02	1.10E-02	.10E-02 5.26E-03	2.00E+02	1.86	0.794	1.058	1.077	51	72	68
20	90	20	1.16E-02  1	1.10E-02	.10E-02   5.26E-03   2.00E+02	2.00E+02	1.85	0.794	1.058	1.077	22	107	88
20	40	40	ļ	1.10E-02	5.26E-03	1.16E-02   1.10E-02   5.26E-03   2.00E+02	1.57	0.794	1.058	1.077	22	29	118
20	20	90		1.10E-02	5.26E-03	1.16E-02   1.10E-02   5.26E-03   2.00E+02	1.36	0.794	1.058	1.077	19	22	156
				Calibi	Calibration Processes	esses					Deposi	Deposition Parameters	meters

## Figure 6B

EDAX Analysis of Films

Comments		Reasonable Agreement	Reasonable Agreement	38.3% Reasonable Agreement	39.4% Reasonable Agreement	Fair Agreement - within limits of EDAX	23.2% Poor Agreement - may be issue of background subtraction	22.4% Reasonable Agreement	Poor Agreement - definite issues with background subtraction	42.7% Reasonable Agreement	39.8% Fair Agreement - within limits of EDAX	Reasonable Agreement	56.6% Reasonable Agreement
ition	Λ	20.7%	21.4%	38.3%	39.4%	19.1%	23.2%	22.4%	26.8%	42.7%	39.8%	59.8%	56.6%
EDAX Composition	¥	17.1%	17.3%	19.0%	19.0%	35.5%	27.2%	55.9%	49.3%	40.8%	34.4%	22.0%	20.4%
ED/	P	61.2%	61.4%	42.7%	41.6%	45.4%	49.7%	21.8%	24.2%	16.5%	25.7%	18.3%	23.0%
	V	20.0%	20.0%	40.0%	40.0%	20.0%	20.0%	20.0%	20.0%	40.0%	40.0%	40.0%	60.0%
Composition	M	20.0%	20.0%	20.0%	20.0%	40.0%	40.0%	<b>%0.09</b>	<b>%</b> 0.09	40.0%	40.0%	40.0%	20.0%
	Æ	60.0%	<b>%</b> 0.09	40.0%	40.0%	40.0%	40.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Power	Watts	81	00X	100	200	81	200 200	901	200	100	200	81	200
	Alloy	-	-	2	2	3	3	4	4	8	2	9	و

